

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

First Named Inventor: William C. Schneider, et al. § Group No.: 3671
Serial No.: 10/005,820 § Examiner: Alexandra Pechhold
Filed: December 4, 2001 §
For: DECELERATION-LIMITING §
ROADWAY BARRIER §

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APPEAL BRIEF
(37 C.F.R. §1.192)

1. This brief is in furtherance of the Notice of Appeal filed in this case on September 22, 2003 with the United States Patent and Trademark Office.
2. The fees required under 37 C.F.R. §1.17(f) and any required petition for extension of time for filing this brief and fees therefore are dealt with the accompanying TRANSMITTAL OF APPEAL BRIEF.

3. This brief is transmitted in triplicate (37 C.F.R. §1.192(a)).
4. This brief contains these items under the following headings and in the order set forth below (37 C.F.R. §1.192(c)).

- I. REAL PARTY IN INTEREST
- II. RELATED APPEALS AND INTERFERENCES
- III. STATUS OF CLAIMS
- IV. STATUS OF AMENDMENTS
- V. SUMMARY OF INVENTION
- VI. ISSUES
- VII. GROUPINGS OF CLAIMS
- VIII. ARGUMENTS
- IX. APPENDIX A -- CLAIMS ON APPEAL
- X. APPENDIX B -- THE FINAL REJECTION
- XI. APPENDIX C -- THE SPECIFICATION ON APPEAL
- XII. APPENDIX D -- REQUEST FOR CLARIFICATION OF OFFICE ACTION
MAILED APRIL 18, 2003
- XIII. APPENDIX E -- DECLARATION OF CHRIS MURPHY, metroPATENT

5. The final page of this brief bears the attorney's signature.

* * * * *

I. REAL PARTY IN INTEREST (37 C.F.R. §1.192(c)(1))

The real party in interest is the United States of America as represented by the Administrator of the National Aeronautics and Space Administration (NASA).

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. §1.192(c)(2))

None.

III. STATUS OF CLAIMS (37 C.F.R. §1.192(c)(3))

The status of claims is as follows:

A. TOTAL NUMBER OF CLAIMS IN THE APPLICATION

Claims in the application are: 1-45.

B. STATUS OF ALL THE CLAIMS

1. Claims Cancelled: 4, 11, 15, and 23
2. Claims Withdrawn from Consideration but not Cancelled: None
3. Claims Pending: 1-3, 5-10, 12-14, 16-22, 24-45
4. Claims Allowed: None
5. Claims Rejected: 1-3, 5-10, 12-14, 16-22, 24-37, and 44-45
6. Claims Objected to But Would be Allowed if Rewritten in Independent Form: 38-43

C. CLAIMS ON APPEAL

The claims on appeal are 1-3, 5-10, 12-14, 16-22, 24-37, and 44-45.

IV. STATUS OF AMENDMENTS (37 C.F.R. §1.192(c)(4))

No amendments have been filed subsequent to the Examiner's final action dated April 18, 2003.

V. SUMMARY OF INVENTION (37 C.F.R. §1.192(c)(5))

Embodiments of the invention provide a roadway barrier system and method for decelerating a moving vehicle in a controlled manner and for retaining the decelerated vehicle. [F]eatures include a sacrificial panel or sheet, in front of a net, that holds up [a] net or mesh. The panel is an element of sufficient strength to support the net in an upright, vertical orientation in which it is adapted to catch and retard an oncoming vehicle, yet the net is also "sacrificial" in that it is adapted to be broken apart upon impact by a vehicle, wherein the vehicle is restrained and decelerated by the net. In one embodiment, the panel is adapted to deflect vehicles that collide only tangentially with the roadway barrier system. In one embodiment, a second sacrificial panel is positioned behind the net. [The] net or mesh of the roadway barrier system receives and captures the moving vehicle. The net or mesh is secured to anchors by energy absorbing straps which deploy longitudinally under a tensional load to decelerate the moving vehicle, the straps providing a controlled resistance to the tensional load over a predefined displacement or stroke to bring the moving vehicle to rest. (ref: App. No. 10/005,820; Page 3, lines 2-10)

VI. ISSUES (37 C.F.R. §1.192(c)(6))

The issues presented for review are as follows:

A. ISSUE I. Whether Claims 1-3, 5-10, 12-14, 16-22, and 24-32 are unpatentable under 35 U.S.C. 103(a) over Uotila (USPN 5,310,277) and Terio (USPN 4,780,020).

B. ISSUE II. Whether Claims 33-37, and 44-45 are unpatentable under (apparently) 35 U.S.C. 102(b) as being anticipated by Uotila ('277). The Examiner grouped these rejections under a 35 U.S.C. 103(a) heading in the April 18, 2003 Office Action, but the Examiner's arguments do not identify a secondary reference but rather, only identifies Uotila ('277) and the Examiner argues inherency. A Request for Clarification of [the] Office Action Mailed April 18, 2003 was submitted by the Applicants on May 16, 2003 as is provided in APPENDIX D of this APPEAL BRIEF. No clarification on the rejections to Claims 33-38 and 44-45 was provided by the Examiner.

C. ISSUE III. Whether, in interpreting the claims broadly for the purposes of examination, is it appropriate to ignore the teachings of Applicants' specification in determining the "*reasonable* meaning and scope" of the claims.

VII. GROUPING OF CLAIMS (37 C.F.R. §1.192(c)(7))

Appellant considers that certain groups of the rejected claims are separately patentable, and that the separate groups of claims do not stand or fall together. In particular, Appellant considers the following groups to be separately patentable:

A. GROUP I. Claims 1-3, 5-10, 12-14, 16-22, and 24-32 stand together. These claims, as amended, all teach a sacrificial panel adapted to hold up a net in a vertical position.

B. GROUP II. Claims 33-37 and 44-45 stand together.

XIII. ARGUMENTS (37 C.F.R. §1.192(c)(8))

The contentions of the Appellant with respect to each of the issues presented for review in heading "VI. ISSUES" above are presented for review under this heading. Each issue presented for review is addressed under a separate subheading.

A. ARGUMENTS PERTAINING TO ISSUE I: GROUP I

ISSUE I addresses whether Claims 1-3, 5-10, 12-14, 16-22, and 24-32 are unpatentable under 35 U.S.C. 103(a) over Uotila (USPN 5,310,277) and Terio (USPN 4,780,020). GROUP I addresses claims 1-3, 5-10, 12-14, 16-22, and 24-32. The arguments presented under this subheading pertain to ISSUE I as it applies to GROUP I.

1. STANDARD OF PATENTABILITY TO BE APPLIED IN OBVIOUSNESS REJECTIONS

In determining the obviousness of an invention, the framework established by the Supreme Court, namely:

- (1) determining the scope and contents of the prior art,
- (2) ascertaining the differences between the prior art and the claims in issue, and

- (3) resolving the level of ordinary skill in the pertinent art,

must be followed in each and every case. *See Graham v. John Deere*, 383 U.S. 1, 148 U.S.P.Q. 459 (1966); M.P.E.P. §2141. In applying the *Graham* factors, an Examiner must apply the following four tenets:

- (1) the claimed invention must be considered as a whole;
- (2) the references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;
- (3) the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and
- (4) reasonable expectation of success is the standard with which obviousness is determined.

Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 229 U.S.P.Q. 182, 187 n.5 (Fed. Cir. 1986); M.P.E.P. §2141.

To reject claims of an application under 35 U.S.C. 103(a), an Examiner has the burden of establishing an un rebutted *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, a patent

Examiner must show: (1) a suggestion or motivation to modify and/or combine the references, (2) a reasonable expectation of success, and (3) the prior art must teach or suggest all the limitations of the rejected claim. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991), *see also*, M.P.E.P. §§2142-3. *See In re Deuel*, 51 F.3d 1552, 1557, 34 U.S.P.Q.2d 1210, 1214 (Fed. Cir. 1995). In the absence of a proper *prima facie* case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent. *See In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992).

2. REFERENCES MUST CONTAIN A SUGGESTION, MOTIVATION, OR TEACHING OF THE PROPOSED COMBINATION

“The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art suggests the desirability of the combination.” M.P.E.P. §2143.01 (*citing In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990)). “The level of skill in the art cannot be relied upon to provide the suggestion to combine references.” M.P.E.P. § 2143.01 (*citing Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308, 50 U.S.P.Q.2d 1161 (Fed. Cir. 1999)). In other words, the absence of an objective suggestion to combine in the prior art references is dispositive of an obviousness determination. *See Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1578-79, 42 U.S.P.Q.2d 1378, 1383 (Fed. Cir. 1997).

As set forth below, there is no suggestion or motivation in the prior art to make the suggested combination or modification, and it is therefore respectfully contended that the rejection is unsupported by the art and should be withdrawn.

(i) First, it is worth noting that Uotila ('277) first describes his invention as a device to stop a moving vehicle in a high-speed chase scenario. *See* '277, Col. 1, lines 11-20. The system of Uotila ('277) must possess portability and must be set-up in a timely manner. A panel would not be conducive to these requirements. A search of the Uotila ('277) patent for any reference to a: "panel," "board," "pane," "sheet," "cover," or "plate" yielded no matches. [The Examiner has acknowledged, at page 3, lines 1-3 of the Office Action of April 18, 2003 provided in APPENDIX B of this APPEAL BREIF, that Uotila ('277) fails to disclose a first sacrificial panel or a second sacrificial panel.] Secondly, a detailed examination of the Uotila ('277) patent reveals nothing in Uotila ('277) that suggests the addition of such a panel, or suggests combining the invention described in Uotila ('277) with a panel. Moreover, in the applications of the invention described in Uotila ('277), in which a barrier must be set-up quickly during a high-speed chase scenario, such a barrier system must possess portability and must be capable of being set-up conveniently at the desired site. Thus, the teachings and context of Uotila ('277) further argue against the conclusion that it would have been suggested to one skilled in the art to consider the reconstruction of the Uotila

(‘277) system by the incorporation therein of structural panels adapted to hold up a barrier net in a vertical position. Obviously, the addition of such a structural member would not be compatible with these requirements and would not be suggested as an alternative structure. Therefore, it is respectfully urged that there is no suggestion, motivation, or teaching in Uotila (‘277) for combining the invention described in Uotila (‘277) with a panel of any kind, not to mention a *sacrificial* panel adapted to hold up the net in a vertical position.

(ii) Regarding the lack of any teaching in Uotila (‘277) regarding such a sacrificial panel having structural characteristics such that it is adapted to support the net, or any suggestion of the desirability thereof, the Examiner maintains that the teachings of Uotila (‘277) should be combined with those of Terio (‘020), in that Terio teaches the desirability of adding decorative panels in a fixed barrier fence (the panels of Terio being employed for aesthetic purposes to hide the “functioning components” of Terio (‘020)). Appellant argues herein that there is no suggestion, motivation, or teaching in Terio for using a panel, which is adapted to support and hold up a barrier net in a vertical position, or a “sacrificial” panel. Regarding the interpretation of the term “sacrificial,” it is recognized that there is precedence for interpreting claim terminology broadly, but not broadly and unreasonably. See *In re Hyatt*, 211 F.3d 1367, 1372, 54 U.S.P.Q.2d 1664, 1667 (Fed. Cir. 2000). The sacrificial panel in the present application is described as “a sacrificial panel

or sheet in front of the net that holds up the net or mesh. Thus, in the context of both Applicants' claims and specification, the panel is a structural member capable of supporting the net. Additionally, the panel is described as capable of *deflecting vehicles that collide only tangentially with the roadway barrier system.*" (emphasis added) App. No. '820, pg. 3, lines 8-10. See also Claim 22. Thus, the use of the terms: "adapted to support the net" and "adapted to support the net in a vertical position," infers that the panel is a functional component of Applicants' system, not merely a decorative covering employed for aesthetic purposes to make the structure more pleasing to look at and to "hide the functioning components of the barrier" and protect it from the weather, as stated in Terio ('020) [See '020, Col. 5, lines 2-4]. The word "sacrificial" infers functionality beyond pure aesthetic reasons. As stated in the specification of the application at issue, the sacrificial panel is designed to sacrifice itself when a vehicle impacts the sacrificial panel in such a way that is not a tangential collision. For example, the sequence of events illustrated in Applicants' specification (See FIGS. 8A-8D in App. No. '820) is such an impact. Further, the additional limitation, defined in the claims at issue, that the sacrificial panel is adapted to hold up a net in a vertical position is not suggested or taught by Terio ('020). Conversely, as stated above, Terio ('020) teaches a panel for aesthetic, visual cover, and weather protection reasons. See '020, Col. 4, lines 66-67 and Col. 5, lines 1-5. Further, Terio's "net" (actually, heavy metal cables) extends between and is supported by massive I-

beams and thus, there is no requirement for a panel to support Terio's "net" in a vertical position. See '020, FIG. 1. Simply stated, the panel taught by Terio ('020) is not the same panel taught by the Applicants nor is it suggestive thereof. The Examiner argues:

It would have been obvious to one having ordinary skill in the art at the time the invention was made to *modify the barrier of Uotila to include first and second sacrificial panels sandwiching the net therebetween as taught by Terio*, since Terio states in column 5, lines 1-8 that the panels would not only make the gate more pleasing to look at but would hide the functioning components of the barrier from view to protect the [barrier] from weather and scrutiny by potential terrorist[s], and two such panels would be employed, one in front of the cables, [and] on[e] in back.

(emphasis added) Final Office Action for App. No. '820, page 3, lines 9-15 (April 18, 2003).

The Examiner is simply stating that it is obvious for one of ordinary skill in the art to combine the teachings of the two references, and specifically, combine the panel taught by Terio ('020) with the invention taught by Uotila ('277). However, the Examiner must establish that it would be obvious to one skilled in the art to combine the panel taught by the Applicants (not the panel taught by Terio ('020)) through either a teaching, suggestion, or motivation in

Terio ('020), given that Uotila ('277) doesn't teach or suggest a panel of any kind. The Examiner has simply not done this. To do this, the Examiner must establish that it would have been obvious for one skilled in the art to modify the panel taught by Terio ('020) (i.e., an aesthetically pleasing, weather protecting, cover panel) wherein such modification would add additional structure and functionality to hold a net in a vertical position, to withstand low level glancing blows, and sacrifice itself for impacts that are more than tangential in nature. In other words, the Examiner must establish a nexus between the panel taught by the Applicants (i.e., a panel adapted to hold up a net in a vertical position and designed to sacrifice itself upon a vehicular collision that is more than a tangential impact) and the panel taught by Terio ('020) (i.e., a panel for aesthetic, visual cover, and weather protection reasons). This nexus is established either through a suggestion or motivation in the prior art references. *See* M.P.E.P. §2142. It should be noted that an Examiner may no longer base a proposed combination on "common knowledge" or "common sense" alone. The issue of whether an obviousness rejection can be made based on "common knowledge" coupled with no specific motivation, teaching, or suggestion *in the prior art* was recently considered by the U.S. Court of Appeals for the Federal Circuit (CAFC). The CAFC held that an obviousness rejection based on "common knowledge and common sense . . . without any specific hint or suggestion in a particular reference" fails to satisfy both the legal requirement for obviousness and the

requirements of the Administrative Procedure Act. *In re Sang Su Lee*, 277 F.3d 1338, 1341, 1346 (Fed. Cir. 2002). The Examiner has simply not established a nexus (i.e., a suggestion or motivation in the prior art references) between the Terio ('020) panel and Applicants' panel. The *Graham* factor "suggestion" must be present regardless of how "minor" or "trivial" the differences are between the claimed invention and the prior art. *See N. Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 15 U.S.P.Q.2d 1321 (Fed. Cir. 1990)(per curiam)(Chief Circuit Judge Markey and Circuit Judges Newman and Archer with Circuit Judge Newman filing an opinion concurring-in-part and dissenting-in-part). Although as stated in *N. Telecom, Inc.*, the differences need only be "minor" or "trivial," in the present case, Appellant argues that the difference in the requirements stated in the App. No. '820 and Terio ('020) are more than "minor" or "trivial" such that the differences will lead one of ordinary skill in the art to two different panel designs. For example, material selection, thickness, compression strength, price, or any other suitable characteristic will be evaluated and decided in light of the specific requirements. The Appellant respectfully argues that teaching the desirability of adding a panel for aesthetic, visual cover, and weather protection purposes is not equivalent to suggesting a sacrificial panel as defined by the Applicants. Appellant poses the question, "Why would someone of ordinary skill in the art want to modify the aesthetically pleasing, weather protection, and cover panel taught by Terio ('020) into a sacrificial

panel as taught by Applicants?” This question is not answered by the Examiner, and an answer to this question is required to establish a *prima facie* case of obviousness. Further, it is a well-known rule that this motivation cannot come from the Applicant or Patentee and must come from somewhere else. See, e.g., *In re Chu*, 66 F.3d 292, 36 U.S.P.Q.2d 1089 (Fed. Cir. 1995) (no motivation for “design choice” proposed by the Examiner and the Board); *In re Nowell*, 891 F.2d 899, 13 U.S.P.Q.2d 1248 (Fed. Cir. 1989). Therefore, although an aesthetically pleasing, weather protecting, cover panel is taught by Terio ('020), there is no suggestion, motivation, or teaching in Terio ('020) for a panel adapted to hold up a net in a vertical position and designed to sacrifice itself upon a collision that is more than a tangential impact.

Therefore, Uotila ('277) and Terio ('020) contain no suggestion, motivation, or teaching to combine a panel adapted to hold up a net in a vertical position and designed to sacrifice itself upon direct impact and subsequent deployment of the net and decelerative means. The Examiner has not established a *prima facie* case of obviousness and the Examiner's 35 U.S.C. 103(a) rejection must be withdrawn.

3. CLAIMED INVENTION MUST BE CONSIDERED AS A WHOLE--
THE PRIOR ART MUST TEACH OR SUGGEST ALL THE
LIMITATIONS OF THE REJECTED CLAIM

The prior art must teach or suggest all the limitations of the rejected claim. See *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Because from the facts derived from the references, as set forth below, all limitations of the rejected claims are not taught or suggested by the prior art references, the rejection is unsupported by the art and should be withdrawn.

(i) As argued above, Terio ('020) teaches an aesthetically pleasing, weather protecting, cover panel. Further, Applicants teach a panel adapted to hold up a net in a vertical position and designed to sacrifice itself upon a collision that is more than a tangential impact. It is undisputed that Terio ('020) does not teach the same panel taught by the Applicants. Thus, the key question is, "Does Terio suggest the same panel taught by the Applicants?" Upon careful examination of Terio ('020), there is no suggestion of employing a panel to withstand a tangential impact. *See* '020, Col. 5, lines 2-5. Further, Terio's "net" is supported by I-beams and thus, Terio's panel is not designed to support Terio's steel cables or "net." *See* '020, FIG. 1. Hence, there is no suggestion in Terio ('020) for Terio's panel to hold up a net in a vertical position.

(ii) As argued above, Uotila ('277) contains no teaching or suggestion of a panel of any kind.

In summary, a fallacy in the Examiner's 35 U.S.C. 103(a) rejection is that the Examiner fails to establish a suggestion in Terio ('020) that Terio's panel can be modified to withstand a tangential impact and adapted to hold up a net in a vertical position. It is true that both Terio ('020) and the Applicants

teach a panel. However, the purposes and contexts and association with subsequent designs and structures are substantively different. And this substantive difference is not being properly accounted for in the Examiner's 35 U.S.C. 103(a) rejection. Simply stated, the specific panel limitations taught by the Applicants in App. No. '820 as a whole are not taught or suggested by either Terio ('020) or Uotila ('277) and therefore, the Examiner has not established a *prima facie* case for obviousness and the Examiner's 35 U.S.C. 103(a) rejection must be withdrawn.

4. CLAIMED INVENTION MUST BE CONSIDERED AS A WHOLE--
PRIOR ART MUST TEACH THE PROBLEM OR ITS SOURCE

The Applicants have recognized the problem whereby a roadway barrier may encounter low level glancing impacts and bumps from vehicles that are usually encountered many times during a racing event or normal roadway traffic. See App. No. '820, page 13, lines 6-9. Uotila ('277) and Terio ('020) simply do not recognize this problem. It is a well-known rule that if recognition of the source of the problem is not taught or suggested by the prior art, a rejection for *prima facie* obviousness is defective even if the solution claimed would have otherwise been obvious. See *Eibel Process Co. v. Minnesota & Ontario Paper Co.*, 261 U.S. 45 (1923).

Because from the facts derived from the references, as set forth below, the references do not teach the problem identified above or the problem's

source, the rejection particularly of Applicants' claims 22 and 24, is unsupported by the art and should be withdrawn.

(i) As argued earlier, the primary reference in Uotila ('277) first describes his invention as a device to stop a moving vehicle in a high-speed chase scenario. *See* '277, Col. 1, lines 11-20. In such a scenario, a device must possess portability and must be set-up in a timely manner. A panel would not be conducive to these requirements. Further, Uotila does teach an embodiment whereby his invention is used as a "safety fence." *See*, '277, Col. 3, line 38. However, in this particular embodiment, Uotila ('277) teaches a means to "seize" and "hold" a vehicle. *See*, '277, Col. 3, lines 30-31. There is no recognition in Uotila ('277) of any alternative situations whereby an impacting moving vehicle is not "seized" and "held." Simply stated, Uotila ('277) does not recognize the problem of low level glancing impacts and bumps whereby it is not desirable to "seize" and "hold" a vehicle.

(ii) The secondary reference in Terio ('020) teaches a barrier "capable of stopping a high speed, heavily loaded vehicle *in its tracks*, unlike many prior barriers which allow a major portion of the speeding vehicle to pass over or through the barrier a significant distance beyond the barrier to eventually contact the structure being protected." (emphasis added) '020, Col. 1, lines 38-43. Simply stated, Terio ('020) has no intention to allow a moving vehicle to tangentially deflect itself from his barrier. There is no recognition

in Terio ('020) of any alternative situations whereby an impacting moving vehicle is not "stopped in its tracks."

Therefore, because Uotila ('277) and Terio ('020) do not recognize the problem of frequent low-level tangential impacts, the Examiner has not established a *prima facie* case for obviousness and the Examiner's 35 U.S.C. 103(a) rejection is defective, even if Applicants' solution (e.g., a panel designed to sacrifice itself upon impacts more than a tangential impact) is otherwise obvious to one skilled in the art.

5. CLAIMED INVENTION MUST BE CONSIDERED AS A WHOLE--
IT IS IMPROPER TO COMBINE REFERENCES WHERE THE
REFERENCES TEACH AWAY FROM THE COMBINATION

"It is improper to combine references where the references teach away from their combination." M.P.E.P. §2145.X.D.2 (*citing In re Grasselli*, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983)).

Because from the facts derived from the references, as set forth below, the references teach away from their combination, the rejection is unsupported by the art and should be withdrawn.

(i) As argued earlier, the primary reference in Uotila ('277) first describes his invention as a device to stop a moving vehicle in a high-speed chase scenario. *See* '277, Col. 1, lines 11-20. In such a scenario, a device must possess portability and must be set-up in a timely manner. A panel would not be conducive to these requirements. Further, Uotila ('277) does

teach an embodiment whereby his invention is used as a “safety fence.” *See*, ‘277, Col. 3, line 38. However, in this particular embodiment, Uotila (‘277) teaches a means to “seize” and “hold” a vehicle. *See*, ‘277, Col. 3, lines 30-31. This is in direct contrast to the Applicants’ invention and specifically, Applicants’ employment of a panel designed to sacrifice itself wherein there is an impact with a moving vehicle more than just a tangential impact. The Applicants’ have designed a roadway barrier whereby an impacting vehicle is not “seized” and “held” in every situation, as is taught by Uotila (‘277). Therefore, since Uotila (‘277) teaches a “safety fence” that “seizes” and “holds” an impacting vehicle in every situation, Uotila (‘277) teaches away from the Examiner’s proposed combination.

(ii) The secondary reference in Terio (‘020) teaches a barrier “capable of stopping a high speed, heavily loaded vehicle *in its tracks*, unlike many prior barriers which allow a major portion of the speeding vehicle to pass over or through the barrier a significant distance beyond the barrier to eventually contact the structure being protected.” (emphasis added) ‘020, Col. 1, lines 38-43. Simply stated, Terio (‘020) has no intention to allow a moving vehicle to pass between the vertical I-beams and then be decelerated at a controlled deceleration rate beyond the cables (as illustrated in FIGS. 8A-8D of Applicants’ drawings), or to tangentially deflect itself from his barrier. Instead, as was noted above, Terio’s panel is designed for aesthetics, weather

protection, and cover purposes. *See* '020, Col. 5, lines 2-5. Hence, Terio ('020) teaches away from the Examiner's proposed combination.

Therefore, the Examiner's references teach away from using a panel designed to sacrifice itself upon an direct impact, the Examiner's *prima facie* case of obviousness has not been met and the Examiner's 35 U.S.C. 103(a) rejection must be withdrawn.

In conclusion, Appellant respectfully argues that the Examiner has not established a *prima facie* case of obviousness for the reasons stated above and thus, the Examiner's 35 U.S.C. 103(a) rejection, as it applies to the claims under GROUP I, must be withdrawn.

B. ARGUMENTS PERTAINING TO ISSUE II: GROUP II

ISSUE II addresses whether Claims 33-37, and 44-45 are unpatentable under (apparently) 35 U.S.C. §102(b) as being anticipated by Uotila ('277). GROUP II addresses Claims 33-37 and 44-45. The arguments presented under this subheading pertain to ISSUE II as it applies to GROUP II.

As stated above, the Examiner failed to specifically state the ground as to what the rejections to Claims 33-37 and 44-45 are based on. The Examiner referred to one reference (Uotila, '277) in rejecting Claims 33-37 and 44-45 as well as using the argument of inherency. Applicants attempted to obtain a clarification from the Examiner (XII. APPENDIX D -- Request for Clarification of Office Action Mailed

April 18, 2003 of this APPEAL BRIEF), but no clarification was subsequently provided. Therefore, it will be assumed, for the purposes of this appeal brief, that the specific ground for rejection was 35 U.S.C. §102(b) as being anticipated by Uotila ('277).

1. STANDARD OF PATENTABILITY TO BE APPLIED IN ANTICIPATION REJECTIONS

For a prior art reference to anticipate in terms of 35 U.S.C. §102, “[A] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). “The identical invention must be shown in as complete detail as is contained in the . . . claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989).

2. REFERENCE MISSING A CLAIM LIMITATION

In the present case, the reference relied upon by the Examiner in the anticipation rejection, namely the patent to Uotila ('277), clearly does not identically show each and every element as set forth in the rejected claims, and therefore, it is respectfully submitted that the rejections under §102(b) must be reversed.

Claims 33-37 and 44-45 each contain the equivalent limitation of “[a] strap being folded upon itself to form at least one loop of mutually adjacent, doubled lengths of strap.” This limitation is part of Applicants’ “means for decelerating a moving body in a controlled manner,” which is analogous to Uotila’s “braking means.” The Uotila (‘277) reference does not teach, disclose or suggest this limitation. Further, the Examiner fails to specifically address this limitation.

A search of Uotila (‘277) for the word, “loop,” yielded several matches. However, Uotila (‘277) uses a loop as part of an attachment means for Uotila’s net and not part of his “braking means.” See ‘277, Col. 4, lines 56-63. Provided below is an excerpt of Uotila’s disclosure at Col. 4, lines 56-63:

“In an embodiment of the net that head rope and foot rope form on the ends of the net a first hitching loop and a second hitching loop. The hitching loop is advantageously large enough to allow the brake members to pass through. In that case no particular, e.g., metallic, fixing clamps etc. are needed which might damage the side of the vehicle after the net has become wound around the vehicle.”

Uotila (‘277) provides little to no details relative to his “braking means,” other than they are “discardable fabric brakes in which the braking force is produced by ripping off each other parts of fabric webbing which have been

secured to each other.” ‘277, Col. 6, lines 42-44. Uotila (‘277) does further reference a Finnish patent application FI 893910. Appellant hired a professional search firm in an attempt to locate the Finnish patent application in hopes of gathering more detailed information on Uotila’s “braking means.” Unfortunately, the search firm was unable to locate FI 893910. A declaration from the professional search firm is provided as part of section XIII APPENDIX E of this APPEAL BRIEF. Further, a search in Uotila (‘277) for the words: “ring,” “hoop,” and “circle” yielded no matches.

In conclusion, Appellant respectfully argues that Uotila (‘277) clearly does not identically show each and every element as set forth in the rejected claims, and therefore, it is respectfully submitted that the rejections under §102(b) must be reversed.

C. ARGUMENTS PERTAINING TO ISSUE III: GROUP I

ISSUE III addresses whether, in interpreting the claims broadly for the purposes of examination, is it appropriate to ignore the teachings of Applicants’ specification in determining the “*reasonable* meaning and scope” of the claims. GROUP I addresses claims 1-3, 5-10, 12-14, 16-22, and 24-32. The arguments presented under this subheading pertain to ISSUE III as it applies to GROUP I.

Regarding the appropriate standard for interpretation of an applicant’s claims during examination, Appellant respectfully contends that under any legally valid standard of claim interpretation, the rejected claims at issue are clearly distinguished

over the cited art, individually or in any combination within the skill of the art, and with or without reference to Applicants' specification and drawings. Regarding the rejection of Claims 1-3, 5-9, 12-14, 16-22, and 24-28 under 35 U.S.C. 103(a) as unpatentable over Uotila ('277) in view of Terio ('020), it was held by the Examiner that the presence of decorative panels (40) in the Terio ('020) system would render it obvious to one skilled in the art to modify the barrier of Uotila ('277) in such a manner as to incorporate first and second sacrificial panels, because the claims should be broadly interpreted for examination purposes. Although, as discussed above, no suggestion was provided for such a combination, it was maintained that, under the practice of giving claim language its broadest reasonable meaning for the purposes of examination, Applicants' claims that refer to the first and/or second sacrificial panels could be interpreted broadly, independently of descriptive language in the specification, in such a manner that they would be suggestive or read on the decorative panels of Terio ('020), in combination with Uotila ('277). Relying on such an interpretation, the Examiner holds that Applicants' claim elements relating to the panels would read on or be suggested by the decorative panels of Terio ('020), and that the combination of the panels of Terio ('020) with the Uotila ('277) structure would be suggested to one in the art. (Despite the fact that, as discussed earlier, the use of such panels in Uotila ('277) would not be compatible with the intended applications and construction of the Uotila barrier.) Appellant respectively contends that wording of Applicants' claims relative to the panels (independent of any reference to Applicants' specification and drawing) clearly distinguishes the claimed

structure and method from any taught by Terio ('020) and/or Uotila ('277). For example, Claim 1 recites "a first sacrificial panel *adapted to hold up the net in a vertical position.*" (emphasis added) Thus, the claim itself requires that the panel be a sacrificial panel "adapted to hold up the net in a vertical position," i.e., having sufficient structural strength to hold up the net in a vertical position. In contrast, and as noted above, the decorative panel (40) of Terio ('020) is plainly characterized in the Terio ('020) reference itself as being provided for aesthetic or decorative purposes, and for hiding "the functioning components of the barrier...." (See Column 5, lines 2-5, of Terio ('020).) In other words, in contrast with the obviously functional nature of the panels in Applicants' claimed system and method (for holding up the net in a vertical position) the panels of Terio ('020) obviously are clearly decorative only, and not functioning components. In view of the description and characterization of the panels (40) in the Terio ('020) patent, their reconstruction as rigid, structural components adapted to be integrated into sacrificial panels capable of holding up the net of the Uotila ('277) structure would not be suggested. Further, the claims of the present application also describe the panels as being "sacrificial panels." Again, nothing in any of the references, alone or in any combination within the skill of the art, would suggest the modification of Uotila ('277) by the addition of any form of sacrificial panels. While the above discussion has been directed in particular to the amended language of Claim 1, similar limitations are present in each of the other independent claims, cited above, rejected under the Terio-Uotila combination.

Thus, even without reference to Applicants' specification or drawings, the limitations present in the rejected claims relative to the nature of the panel(s), in the claimed combinations, defines the panels as components having a purpose and construction far removed from that of the panels of Terio ('020). For these reasons and those discussed in detail hereinabove, the assertion by the Examiner that it would be suggested to one skilled in the art to modify the structure and application of the Uotila ('277) restraint system by incorporating therein one or more panels as taught shown in Terio ('020) because the language of Applicants' claims should be interpreted broadly as encompassing all (e.g., decorative, non-functioning) forms of panels such as those shown and described in Terio ('020), is respectfully traversed.

It is respectfully contended that Applicants' claims relating to the sacrificial panels are distinguishable from the references and allowable on their face, under any normal interpretation of the terminology entailed. In the alternative, however, it is also respectfully contended that Applicants' claims should be interpreted in light of the relevant teachings of Applicants' own specification and drawings. Clearly, the specification and drawing of the present application describe and show the sacrificial panel(s) as being functioning, structural elements, rather than decorative coverings provided merely to conceal the functioning components. As seen in Figures 5, 6, and 8 and as set forth at page 10, line 18 through page 11, line 8 of Applicants' specification, the panels are clearly described as being of a structural nature for holding up the net. For example, at lines 5-6, page 11, the net is referenced as being sandwiched between the front and rear sacrificial panels "for support." Moreover, as

set forth in Applicants' specification at page 13, lines 5-11, in some embodiments, the panels are employed actually to deflect an oncoming vehicle that may impact against the smooth front surface of the panel at an acute angle, or with low level glancing impacts. Also, as shown in Figures 8A-8D, despite their structural strength, the panels are also sacrificial panels adapted to fracture in the event of a near head-on collision, thereby permitting the vehicle to be captured by the net supported by the front panel, and decelerated by the decelerative straps. It is thus clear, particularly when the Applicants' claims are interpreted in light of the specification and drawings, that the panels are sacrificial panels having structural strength capable of holding up the net in a vertical position, and serving as a "functioning" rather than decorative element of the combination, in contrast with Terio ('020). Again, nothing in Terio ('020) would suggest that the decorative panels of Terio ('020), the purpose of which is stated by Terio ('020) as that of hiding the functioning components of Terio ('020), could be modified as a structural, functioning component, capable of holding up the net of Uotila ('277), or of deflecting a vehicle, or of disintegrating upon direct impact by a vehicle, particularly if Applicants' claims are interpreted in light of the specification and drawings.

From telephone discussions with the Examiner and her supervisor, it is understood that the claims were intentionally constructed broadly in order that the examination of the case would extend to consideration of a broader range of potentially relevant prior art. In view of the above discussion, it is respectfully contended that the interpretation given Applicants' claims is contrary to any

reasonable interpretation of the meaning of the claims, on their face, or by dictionary definitions. Further, it is respectfully contended that the failure to include a consideration of the teachings of the specification and drawings is not appropriate under current legal precedence. It is maintained that, in interpreting the claims broadly for the purposes of examination, it is not legally appropriate to ignore the teachings of Applicants' specification in determining the "reasonable meaning and scope" of the claims. In fact, the M.P.E.P. states that "[d]uring patent examination, the pending claims must be 'given the broadest *reasonable* interpretation *consistent with the specification*.'" (emphasis added) M.P.E.P. §2111. Although recognizing the teachings of *In re Morris*, 127 F.3d 1048 (Fed. Cir. 1997), it is noted that the Board has in several recent decisions referenced the teachings of the specification and drawings for purposes of understanding the scope of a rejected claim. [e.g., *Ex parte Horstmann*, 1997-3241.]. Further, holdings of the U.S. Supreme Court and the Federal Circuit have supported the necessity and appropriateness of referring to the teachings of the applicant in the specification, drawings, as well as that present in the other claims. The *Markman v. Westview Instruments Inc.* decision (116 S.Ct. 1384; 38 U.S.P.Q.2d 1461) is relevant. As stated in *Markman*:

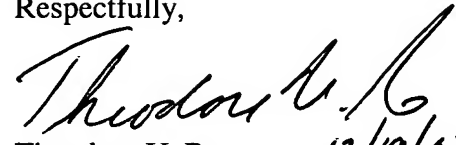
"In the main, we expect, any credibility determinations [by the courts] will be subsumed within the necessarily sophisticated analysis of the whole document, required by the standard construction rule that a term can be defined only in a way that comports with the instrument as a whole." (emphasis added)

While it is recognized that the *Markman* Court was referring in particular to claim interpretation in the context of infringement and jury vs. judge roles, the Court recognized and affirmed as well-established black letter law the “standard construction rule” of interpreting terms in a legal document (referring in particular to terms included in the claims) in a way that comports to the instrument as a whole (the specification and drawings). To conclude that this black letter “standard construction rule,” as it is characterized by the Supreme Court, is not applicable to the examination of claims within the Patent and Trademark Office is tantamount to saying that the Office is not subject to established legal principles, or to common law precedence. It is, in effect, equivalent to interpreting the law in a manner that makes the Examiner’s job more “convenient” and expedient, but which is contrary to the established legal principles under which the resulting patent will be interpreted under the law. In summary, it is respectfully maintained that the Examiner has failed to accept or acknowledge the “reasonable meaning and scope” of Claims 1-3, 5-9, 12-14, 16-22, and 24-28, under either interpretive rule, e.g., under either the *In Morris* “reasonable meaning” test or the *Markman* “standard construction rule.” In the alternative, it is respectfully urged that the “standard construction rule” should be applied.

D. CONCLUSION OF ARGUMENTS

In conclusion, Appellant respectfully argues that the Examiner has not established a *prima facie* case of obviousness and a case of anticipation for the reasons stated above and thus, the Examiner's 35 U.S.C. 103(a) rejection, as it applies to all rejected claims, must be withdrawn.

Respectfully,


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IX. APPENDIX A -- CLAIMS ON APPEAL

1. A deceleration – limiting barrier, comprising:
 - a net;
 - anchors;
 - a flexible strip arranged a flexible strip arranged to secure the net to the anchors, with portions of the strip joined together in a manner as to be susceptible to being pulled apart under a load that is less than a load capacity of the strip; and
 - a first sacrificial panel adapted to hold up the net in a vertical position.
2. The barrier of claim 1, wherein the portions of the strip are joined with fasteners having a tensile strength that is less than a tensile strength of the strip.
3. The barrier of claim 2, wherein the fasteners are stitched into the portions of the strip.
4. (Cancelled)
5. The barrier of claim 1, wherein the first sacrificial panel includes a smooth surface on one side.
6. The barrier of claim 1, further comprising a second sacrificial panel, the first and second sacrificial panels sandwiching the net therebetween.

7. The barrier of claim 1, wherein a plurality of barriers are placed end-to-end alongside a roadway.
8. The barrier of claim 1, wherein the strip provides a substantially constant level of deceleration.
9. The barrier of claim 1, wherein the strip provides a non-constant level of deceleration.
10. A barrier for limiting decelerating of a moving body, comprising:
 - means for receiving and retaining the moving body;
 - means for anchoring the receiving and retaining means;
 - means for decelerating the moving body in a controlled manner to thereby limit the deceleration thereof to below a predefined maximum deceleration level; and
 - a first sacrificial panel adapted to hold up the means for receiving and retaining the moving body.
11. (Cancelled)
12. The barrier of claim 10, wherein the deceleration means provides a substantially constant level of deceleration.

13. The barrier of claim 10, wherein the deceleration means provides a non-constant level of deceleration.

14. A deceleration-limiting roadway barrier system, comprising:

a first row of barriers positioned end-to-end alongside a roadway;

a second row of barriers positioned end-to-end alongside the first row of barriers, the barriers of the first row being staggered from the barriers of the second row;

a plurality of anchors fixedly mounted in the ground alongside the roadway;

each barrier comprising a net and one or more flexible strips arranged to secure the net to one or more anchors, with portions of each strip joined together in a manner as to be susceptible to being pulled apart under a load that is less than a load capacity of the strip; and

a first sacrificial panel adapted to hold up the net in a vertical position.

15. (Cancelled)

16. The roadway barrier system of claim 14, wherein the first sacrificial panel includes a smooth surface on one side.

17. The roadway barrier system of claim 14, wherein each barrier further comprises a second sacrificial panel, the first and second sacrificial panels sandwiching the net therebetween.

18. The roadway barrier system of claim 14, wherein the strip provides a substantially constant level of deceleration.
19. The roadway barrier system of claim 14, wherein the strip provides a non-constant level of deceleration.
20. The roadway barrier system of claim 14, further comprising a plurality of support members mounted alongside the first and second row of barriers.
21. The roadway barrier system of claim 14, wherein each barrier has a male portion and a corresponding female portion of a mated joint.
22. A method of decelerating a moving body, comprising:
supporting a net with a first sacrificial panel that is also capable of deflecting moving bodies colliding tangentially therewith;
receiving the moving body in the net;
deploying a plurality of energy absorbing straps attached to the net;
decelerating the moving body using the energy absorbing straps; and
limiting the deceleration of the moving body to below a predefined maximum deceleration level.
23. (Cancelled)

24. The method of claim 22, further comprising sandwiching the net between the first sacrificial panel and a second sacrificial panel.
25. The method of claim 22, further comprising anchoring a first row of nets end-to-end alongside a roadway and a second row of nets end-to-end alongside the first row.
26. The method of claim 25, wherein the nets in the first row are staggered relative to the nets in the second row.
27. The method of claim 22, further comprising decelerating the moving body at a substantially constant deceleration.
28. The method of claim 22, further comprising decelerating the moving body at a non-constant deceleration.
29. The deceleration-limiting barrier of claim 6 wherein the first and second sacrificial panels are made of a thin layer of epoxy, concrete or plywood, or combinations thereof.
30. The barrier of claim 10 wherein the first sacrificial panel is made of a thin layer of epoxy, concrete or plywood, or combinations thereof.

31. The deceleration-limiting roadway barrier system of claim 17 wherein the first and second sacrificial panels are made of a thin layer of epoxy, concrete or plywood, or combinations thereof.

32. The method of claim 22 wherein the first and second sacrificial panels are made of a thin layer of epoxy, concrete or plywood, or combinations thereof.

33. A barrier for decelerating a moving body, comprising:

receiving means for receiving and retaining the moving body upon the moving body impacting against the receiving means, the moving body comprising means imparting forces against the receiving means upon impact by a moving body;

anchoring means for anchoring the receiving means;

means for decelerating the moving body in a controlled manner to thereby limit the deceleration thereof to below a predefined maximum deceleration level, the means for decelerating the moving body comprising at least one flexible, energy absorbing strap connected intermediate the receiving means and the anchoring means for receiving forces exerted longitudinally along the length of the strap upon impact by a moving body upon the receiving means, the strap being folded upon itself to form at least one loop of mutually adjacent, doubled lengths of strap, the mutually adjacent lengths of strap being stitched together by stitches formed through the mutually adjacent lengths of strap, the tensile strength of the stitches being less than that of the strap and being sufficiently low that they are ripped apart by the forces applied along the length of the strap by the moving body, the

strap being of sufficient tensile strength to retain longitudinal continuity in the event the at least one loop is pulled apart upon the stitches being ripped apart by said longitudinal forces.

34. The barrier of Claim 33, wherein the stitches are formed in a pattern extending longitudinally along the adjacent lengths of strap, whereby the stitches are ripped apart sequentially upon the application of forces along the length of the strap.

35. The barrier of Claim 33, wherein the stitches extend longitudinally along the adjacent lengths of strap.

36. A barrier for decelerating a moving body, comprising:

means for receiving and retaining the moving body;

means for anchoring the receiving and retaining means;

means for decelerating the moving body in a controlled manner to thereby limit the deceleration thereof to below a predefined maximum deceleration level, the means for decelerating the moving body comprising at least one flexible, energy absorbing strap connected intermediate the means for receiving and retaining the moving body and the means for anchoring the receiving and retaining means, the strap having a plurality of loops formed therein and mutually spaced along the strap, each loop being formed of mutually adjacent lengths of the strap stitched together by sacrificial stitching formed between the mutually adjacent lengths of strap and defining stitched portions in the respective loops, the tensile strength of the strap being greater than that of the stitches.

37. The barrier of Claim 36, wherein the load capacity of the energy absorbing strap is expressed by the equation:

$$Load = Fr \cdot (Xm1 + Xm2 + Xm3 + \dots + Xmi)$$

wherein the energy absorbing stroke of each loop comprises the length of the respective stitched portion formed therein, and wherein the sum of $Xm1$, $Xm2$, $Xm3$, ..., Xmi represents the total stroke provided by the individual loops.

38. The barrier of Claim 37, wherein the strokes of each loop are identical.

39. The barrier of Claim 37, wherein the strokes of each of the respective loops are not identical.

40. The barrier of Claim 37, wherein the load capacities of the loops differ.

41. The barrier of Claim 40, the loops comprising means for applying successive decelerative forces upon a moving body impinging upon the means for receiving and retaining the moving body as the loops are ripped apart, the stitches of at least one of the loops being of greater tensile strength than those of at least one other loop, whereby the decelerative forces applied by the loop having stitches of greater tensile strength are greater than those applied by the at least one other loop.

42. The barrier of Claim 41, wherein the energy absorbing strap comprises means for applying decelerative forces upon a moving body impinging upon the means for receiving and retaining the moving body as the loops are successively ripped apart.

43. The barrier of Claim 40, wherein the energy absorbing strap comprises means for applying successively greater decelerative forces upon a moving body impinging upon the receiving means upon loops of successively greater load capacity being ripped apart.

44. A method of decelerating a moving body, comprising:

providing a means for receiving and retaining the moving body;

deploying a plurality of energy absorbing straps attached to the means for receiving and retaining the moving body, each of the energy absorbing straps being folded upon itself to form one or more loops of mutually adjacent, doubled lengths of strap, the mutually adjacent lengths of strap being stitched together by stitches formed through the mutually adjacent lengths of strap, the tensile strength of the straps being greater than that of the stitches, the stitches being formed along at least part of the lengths of the mutually adjacent lengths of strap;

receiving the moving body in the means for receiving and retaining the moving body;

decelerating the moving body by resistance provided by the stitches as they are ripped apart upon impact from the moving body ; and

limiting the deceleration of the moving body to below a predefined maximum deceleration level, the step of limiting the deceleration of the moving body including

providing stitches of tensile strength less than the decelerative forces transmitted to the energy absorbing straps by the moving body.

45. The method of decelerating a moving body of Claim 44, comprising providing multiple loops in each energy absorbing strap, the loops being mutually spaced along the length of each strap, and wherein the method of decelerating a moving vehicle comprises decelerating the moving body by resistance provided by the stitches of one or more of the multiple loops as they are ripped apart as forces are exerted along the length of the strap.

X. APPENDIX B -- THE FINAL REJECTION

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Application No.

Applicant(s)

10/005,820

SCHNEIDER ET AL.

Office Action Summary

Examiner

Art Unit

Alexandra K Pechhold

3671

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-10,12-14,16-22,24-37,44,45 is/are rejected.
- 7) ☒ Claim(s) 38-43 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-10, 12-14, 16-22, and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uotila (US 5,310,277) in view of Terio (US 4,780,020).

Regarding claims 1, 5, 6, 10, 22, and 24, Uotila discloses a method and device for impeding motion of a land vehicle comprising:

- a net (or means for receiving and retaining the moving body), seen as net (1) in Figs. 1, 4, and 5
- anchors (or means for anchoring the receiving and retaining means), seen as anchors (3) in Figs. 1 and 4, and
- a flexible strip arranged to secure the net to the anchors (or means for decelerating the moving body in a controlled manner), seen as brakes (4, 5) in Figs. 1 and 4-7, which are described by Uotila as discardable fabric brakes formed of one or several ribbons which have been woven or stitched together over a certain length, so that ribbons are forced to be torn apart when pulled (Col 2, lines 40-65).

Uotila fails to disclose a first sacrificial panel, which includes a smooth surface on one side, and a second sacrificial panel, the first and second panels sandwiching the net therebetween. Terio teaches a vehicle barrier comprised of I-beam posts with cable therebetween to stop a high speed vehicle (see abstract). The barrier employs panels (40), which would not only make the gate more pleasing to look at but would hide the functioning components of the barrier from view to protect the from weather and scrutiny by potential terrorist (Col 5, lines 1-5). Two such panels would be employed between each pair of I-beams, one in front of the cables, on in back, between the cables and webs (2, 3), respectively (Col 5, lines 5-8). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the barrier of Uotila to include first and second sacrificial panels sandwiching the net therebetween as taught by Terio, since Terio states in column 5, lines 1-8 that the panels would not only make the gate more pleasing to look at but would hide the functioning components of the barrier from view to protect the from weather and scrutiny by potential terrorist, and two such panels would be employed, one in front of the cables, on in back.

Regarding claim 2, Uotila discloses that the brake members are formed of two ribs that have been woven or stitched together over a certain length, and they usually have two ends, on which draw members have been formed. Pulling on the draw members will cause the ribbons to be forced to be torn apart (Col 2, lines 40-51). Therefore, since the stitching breaks first, tearing apart the ribbons, the tensile strength of the stitching must be less than the tensile strength of the ribbons.

Regarding claim 3, Uotila discloses that the ribbons forming the fabric brakes

X. APPENDIX B -- THE FINAL REJECTION

Application/Control Number: 10/005,820

Page 4

Art Unit: 3671

have been woven or stitched together over a certain length (Col 2, lines 40-51), therefore the stitched and/or woven portions serving as the fasteners.

Regarding claims 8, 9, 12, 13, 27, and 28, Uotila discloses both a non-constant level of deceleration as well as a substantially constant level of deceleration in the action of the braking members (4, 5). Uotila notes that the first brake members are open, meaning that in conclusion of their operation the first brake members altogether cease to operate, and release their grip. The second brake members become locked in conclusion of their retarding effect, whereby the braking force increases to great height in the end (Col 2, lines 52-61). Therefore, it appears the first breaking members provide a substantially constant level of deceleration, and the second breaking members provide a non-constant level of deceleration since the braking force increases to great height in the end.

Regarding claims 7, 14, 16, 17, 21, 25, and 26, Uotila discloses a device for impeding motion of a land vehicle comprising:

- a first barrier, seen as net (1¹) in Fig. 9
- a second barrier, seen as net (1²) in Fig. 9, positioned alongside the first net, the first row being staggered from the second row (Col 3, lines 21-25)
- a plurality of anchors, seen as anchors (3) in Figs. 1 and 4
- each barrier comprising a net, seen as nets (1¹) and (1²) in Fig. 9, and one or more flexible strips arranged to secure the net to the anchors, seen as brakes (4, 5) in Figs. 1 and 4-7, which are described by Uotila as discardable fabric brakes formed of one or several ribbons which have

been woven or stitched together over a certain length, so that ribbons are forced to be torn apart when pulled (Col 2, lines 40-65).

Uotila fails to disclose a first sacrificial panel, which includes a smooth surface on one side, and a second sacrificial panel, the first and second panels sandwiching the net therebetween. Terio teaches a vehicle barrier comprised of I-beam posts with cable therebetween to stop a high speed vehicle (see abstract). The barrier employs panels (40), which would not only make the gate more pleasing to look at but would hide the functioning components of the barrier from view to protect the from weather and scrutiny by potential terrorist (Col 5, lines 1-5). Two such panels would be employed between each pair of I-beams, one in front of the cables, on in back, between the cables and webs (2, 3), respectively (Col 5, lines 5-8). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the barrier of Uotila to include first and second sacrificial panels sandwiching the net therebetween as taught by Terio, since Terio states in column 5, lines 1-8 that the panels would not only make the gate more pleasing to look at but would hide the functioning components of the barrier from view to protect the from weather and scrutiny by potential terrorist, and two such panels would be employed, one in front of the cables, on in back.

Uotila also fails to disclose a first row of barriers and second row of barriers positioned end-to-end (claim 14), with each barrier having a male portion and corresponding female portion of a mated joint (claim 21). Yet Uotila notes that it is obvious that any number of nets, such as may be considered necessary, can be placed one after the other (Col 3, lines 35-37). The nets are designed for greatest possible

cover for use in stopping any passenger car that is in motion on the road (Col 4, lines 22-25). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the staggered nets in Fig. 9 of Uotila so there is a row of first and second barriers positioned end-to-end, and each barrier having corresponding male and female portions of a mated joint, since Uotila states in column 3, lines 35-37 that it is obvious that any number of nets, such as may be considered necessary, can be placed one after the other, and in column 4, lines 22-25 that the nets are designed for greatest possible cover for use in stopping any passenger car that is in motion on the road. So therefore if you have multiple side-by-side cars approaching the net, a row of barriers would be the logical solution in order to satisfy Uotila's desire for the greatest possible cover for use in stopping any passenger car that is in motion on the road, and clearly the barriers would have to be joined by some sort of mated joint. Furthermore, it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claims 18 and 19, Uotila discloses both a non-constant level of deceleration as well as a substantially constant level of deceleration in the action of the braking members (4, 5). Uotila notes that the first brake members are open, meaning that in conclusion of their operation the first brake members altogether cease to operate, and release their grip. The second brake members become locked in conclusion of their retarding effect, whereby the braking force increases to great height in the end (Col 2, lines 52-61). Therefore, it appears the first breaking members provide a substantially constant level of deceleration, and the second breaking members

X. APPENDIX B -- THE FINAL REJECTION

Application/Control Number: 10/005,820

Page 7

Art Unit: 3671

provide a non-constant level of deceleration since the braking force increases to great height in the end.

Regarding claim 20, Uotila illustrates a plurality of support members mounted alongside the barriers, seen as posts (6) in Figs. 1 and 4.

Regarding claim 29, 30, 31, and 32, the combination of Uotila and Terio fails to disclose panels made of a thin layer of epoxy, concrete, or plywood, or combinations thereof. Terio fails to specify the material of panels (40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Uotila having the panels of Terio so that the panels are made of a thin layer of epoxy, concrete, or plywood, or combinations thereof, since such materials are readily accessible and economical, and commonly used materials for panels.

Regarding claims 33, 36, and 44, Uotila discloses the limitations of the claimed invention as discussed in reference to claim 10 above. Inherently, the deceleration will be controlled, since the moving body encounters the effects of the receiving means, anchoring means, and means for decelerating the moving body. Also, the tensile strength of the stitches must be less than that of the strap, since Uotila states that the ribbons which are stitched together over a certain length are forced to be torn apart (Col 4, lines 40-51). Furthermore, the means for decelerating the moving body, which are seen as the fabric brakes (4, 5) in Uotila comprise at least one flexible, energy absorbing strap connected intermediate the receiving means and anchoring means, since Uotila discloses in column 2, lines 40-65 the construction and operation of the

is this really an anchoring component?

brake members, which may be composed of two ribbons that have been woven or stitched together over a certain length and are then forced to be torn apart.

Regarding claims 34 and 35, inherently the stitches in the brake members of Uotila will be ripped apart sequentially (Col 2, lines 40-65) due to the nature of the tearing action. And likewise, the stitches extending longitudinally along adjacent lengths of strap, since Uotila states that two ribbons have been woven or stitched together over a certain length (Col 4, lines 43-45).

Regarding claim 37, inherently the load capacity of the brake members of Uotila is the sum of the energy absorbing stroke of each stitch (Col 4, lines 43-45).

Regarding claim 45, Uotila discloses that the brake member may for instance be composed in that two ribbons have been woven or stitched together over a certain length (Col 4, lines 42-45). Pulling on the draw members will produce in the brake member a uniform braking force opposing the pull so that the ribbons are forced to be torn apart (Col 4, lines 46-49).

Allowable Subject Matter

3. Claims 38-43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

4. Applicant's arguments filed 3/5/03 have been fully considered but they are not persuasive.

Applicant has amended independent claims 1, 10, 14, and 22 to recite a first sacrificial panel, and cancelled the dependent claims that recited this limitation. The examiner is now rejecting these independent claims just as the dependent claims were rejected, using the teaching of Terio (US 4,780,020) in combination with Uotila (US 5,310,277). Applicant attempts to differentiate the teaching of Terio from applicant's sacrificial panel in that Terio is unconcerned with the safety of vehicle occupants and uses a non-constant rate of deceleration, whereas applicant's invention is geared toward providing a method to more slowly decelerate a vehicle so as to prevent injury to vehicle occupants. Applicant states that the goals of the applicant and Terio are directly contrary. While this may be true, and the applicant's arguments may have merit, the arguments are irrelevant though to the claims and beyond the scope of the claim language. The purpose, use, application, result, method of using, etc. of the sacrificial barrier are beyond the scope of the apparatus claims 1, 10, and 14. With respect to the method claim 22, as amended, the net of Uotila modified with the panel of Terio is certainly capable of deflecting moving bodies colliding tangentially therewith, and breaking away the first panel, depending on the size, speed, momentum, weight, etc. of the moving body as well as the strength of the panel.

X. APPENDIX B -- THE FINAL REJECTION

Application/Control Number: 10/005,820

Page 10

Art Unit: 3671

Conclusion

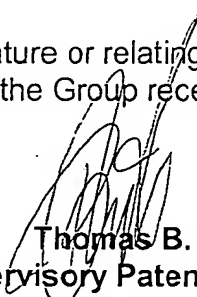
5. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexandra Pechhold whose telephone number is (703) 305-0870. The examiner can normally be reached on Mon-Thurs. from 8:00am to 5:30pm and alternating Fridays from 8:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas B. Will, can be reached on (703)308-3870. The fax phone number for this Group is (703) 305-3597.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-1113.


Thomas B. Will
Supervisory Patent Examiner
Group 3600

AKP
4/10/03

XI. APPENDIX C -- THE SPECIFICATION ON APPEAL

*As
filed*

DECELERATION-LIMITING ROADWAY BARRIER

ORIGIN OF THE INVENTION

The invention described herein was made by employee(s) of the United States Government and may be manufactured or used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon
5 or therefor.

CLAIM OF PRIORITY

This application claims priority from, and incorporates herein by reference, provisional application number 60/254,285, entitled "Energy Absorbing System," filed with
10 the U.S. Patent and Trademark Office on December 6, 2000.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates generally to barrier systems and, more particularly, to
15 deceleration-limiting barrier systems for decelerating moving objects in a controlled manner.

Description of the Related Art

Various types of structures and mechanisms have been employed for decelerating or arresting moving objects. In particular, a number of protective barriers and energy
20 dissipating mechanisms have been devised for arresting a moving vehicle.

At racetracks, for example, protective peripheral barrier walls (especially in the curved portions of the track) are frequently made of rigid materials such as reinforced

concrete for the purpose of containing a crash vehicle in order to prevent it from deviating from the raceway and colliding with other objects, or with spectators. Such rigid walls or barriers can cause dangerous levels of deceleration ("G" forces) that may kill or severely injure the driver. Similar results may occur with these rigid barriers on public highways where serious injury or death may result when a motorist deviates from the road and collides with a rigid barrier at high velocity.

Deformable barriers have been employed in some instances to help absorb some of the energy involved in a high-speed collision. For example, "barrel" barriers, which typically consist of several crushable 50-gallon drums positioned side-by-side, provide a degree of protection to vehicles and their occupants during an impact by increasing the distance through which the vehicle is decelerated. Other examples of deformable barriers include stacked vehicle tires and bales of hay. While deformable barriers can lessen the "G" forces involved in a crash, such barriers have generally provided sub-optimal impact absorption. Moreover, deformable barriers can create problems of their own, for example, by "catching" the vehicles that strike them tangentially, leading to more severe damage and injuries than would be the case had the vehicle been permitted to skid along the barrier. In addition, if the vehicle crashes into such a barrier at high speed and is not retained by the barrier, the crashed vehicle and attendant debris can be dangerously thrown back into the path of oncoming vehicles, or into the viewing stands.

Accordingly, there is a need for an improved roadway barrier system and, more specifically, a deceleration-limiting roadway barrier system for decelerating the vehicles in a controlled manner and for retaining moving vehicles that collide with the barrier system.

SUMMARY OF THE INVENTION

Embodiments of the invention provide a roadway barrier system and method for decelerating a moving vehicle in a controlled manner and for retaining the decelerated vehicle. A net or mesh of the roadway barrier system receives and captures the moving vehicle. A net or mesh of the roadway barrier system receives and captures the moving
5 vehicle. The net or mesh is secured to anchors by energy absorbing straps. The energy absorbing straps deploy under a tensional load to decelerate the moving vehicle, the straps providing a controlled resistance to the tensional load over a predefined displacement or stroke to bring the moving vehicle to rest. Additional features include a sacrificial panel or sheet in front of the net that holds up the net or mesh while deflecting vehicles that collide
10 only tangentially with the roadway barrier system.

In general, in one aspect, the invention is directed to a deceleration-limiting barrier comprising a net, anchors, and a flexible strip arranged to secure the net to the anchors. Portions of the strip are joined together in a manner so as to be susceptible to being pulled apart under a load that is less than a load capacity of the strip.

15 In general, in another aspect, the invention is directed to a barrier for limiting decelerating of a moving body. The barrier comprises means for receiving and retaining the moving body, means for anchoring the receiving and retaining means, and means for decelerating the moving body in a controlled manner to thereby limit the deceleration thereof to below a predefined maximum deceleration level.

20 In general, in yet another aspect, the invention is directed to a deceleration-limiting roadway barrier system. The roadway barrier system comprises a first row of barriers positioned end-to-end alongside a roadway, and a second row of barriers positioned end-to-end alongside the first row of barriers, the barriers of the first row being staggered from the

barriers of the second row. A plurality of anchors are fixedly mounted in the ground alongside the roadway. Each barrier comprises a net and one or more flexible strips arranged to secure the net to one or more anchors, with portions of each strip joined together in a manner as to be susceptible to being pulled apart under a load that is less than a load capacity
5 of the strip.

In general, in still another aspect, the invention is directed to a method of decelerating a moving body. The method comprises receiving the moving body in a net, deploying a plurality of energy absorbing straps attached to the net, decelerating the moving body using the energy absorbing straps, and limiting the deceleration of the moving body to below a
10 predefined maximum deceleration level.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the system and method of the present invention may be had by reference to the following detailed description when taken in conjunction
15 with the accompanying drawings wherein:

Figures 1A-1C illustrate an energy absorbing strap according to some embodiments of the invention;

Figures 2A-2B illustrate the load that can be absorbed by a loop of the energy absorbing strap according to some embodiments of the invention;

20 Figures 3A-3B illustrate the load that can be absorbed by multiple loops of the energy absorbing strap according to some embodiments of the invention;

Figures 4A-4B illustrate the energy absorbing strap attached to a net according to some embodiments of the invention;

Figure 5 illustrates a deceleration-limiting barrier according to some embodiments of the invention;

Figures 6A-6B illustrate the deceleration-limiting barrier secured to an anchor according to some embodiments of the invention;

5 Figures 7 illustrates a deceleration-limiting roadway barrier system according to some embodiments of the invention;

Figures 8A-8D illustrate a progressive view of a vehicular crash into the deceleration-limiting roadway barrier system according to some embodiments of the invention; and

10 Figure 9 illustrates a flow chart of a method of decelerating a moving body according to some embodiments of the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

Following is a detailed description of the drawings wherein reference numerals for
15 similar components and elements are carried forward.

As mentioned previously, embodiments of the invention provide a deceleration-limiting roadway barrier system and method for retaining and decelerating a moving vehicle. The roadway barrier system is designed to limit the amount of deceleration or *G* force experienced by the moving vehicle to a certain preset level, regardless of how fast
20 the vehicle is traveling at the time of impact. In other words, a faster traveling vehicle will not experience more severe deceleration than a slower traveling vehicle; both vehicles will experience about the same level of deceleration regardless of their respective speeds. The

specific deceleration level may be set at a certain maximum as needed to safely bring the vehicles and the occupants therein to a complete stop.

In some embodiments, the deceleration-limiting roadway barrier system comprises two parallel rows of barriers alongside a roadway or racetrack. The barriers in each row are placed end-to-end along the roadway or racetrack, with the barriers in one row staggered relative to the barriers in the other row. Each barrier is anchored to the ground by ground anchors and includes a net and a flexible, energy absorbing strip arranged so as to secure the net to the anchors. Portions of the flexible strip may be joined to each other in a manner such that the joined portions may be pulled apart under a load which is less than the load capacity of the strip.

Figure 1A through Figure 7 is a sequence of sketches that, when taken as a whole, illustrate the construction of a deceleration-limiting roadway barrier system, beginning with the formation of energy absorbing straps and leading up to the assembly of deceleration-limiting barriers and to the installment of those barriers in a roadway barrier system.

Referring now to Figures 1A-1B, an energy absorbing line, strip, or strap 10 is shown. The energy absorbing strap 10 is preferably made of a flexible material having a high tensile strength such as Kevlar™ or Nylon™. In some embodiments, the energy absorbing strap 10 may be folded or otherwise arranged to form a loop 12 in the strap 10. The inner surface of the loop 12 may then be stitched or otherwise joined together with fasteners 14, as disclosed in U.S. Patent Nos. 5,071,091 and 6,206,155, entitled "Load Limiting Energy Absorbing Lightweight Debris Catcher" and "Energy Absorbing Protective Shroud," respectively, which patents are hereby incorporated by reference.

The fasteners 14 of the loop 12 may be made of threads, cords, or other suitable fasteners, and are selected to have a lower tensile strength than that of the strap 10. The tensile strength of the fasteners 14 and, in part, the pattern in which they are stitched, determine the load required to pull apart the loop 12. It is important that this load be below the load capacity of the strap 10, preferably by at least a certain percentage. Thus, when a load is applied to the strap 10, the fasteners 14 will break or rip away to allow the loop 12 to be pulled apart. In effect, the load on the strap 10 is transferred to the fasteners 14 where it is absorbed and dissipated when the fasteners 14 break and rip away. The load capacity of the strap 10 will therefore not be reached or exceeded regardless of how large a load is applied provided there are enough fasteners 14 in the loop 12 to absorb the load.

It should be noted that, although the term "loop" is used herein, in general, any portion of the energy absorbing strap 10 may be joined to any other portion or portions of the strap 10 regardless of whether a "loop" is formed. Thus, in addition to a loop 12 being formed in the energy absorbing strap 10, a figure "S" shape, for example, or some other configuration may also be formed and stitched together in the strap 10.

Figure 1C illustrates a close-up view of a front face of the loop 12 formed in the energy absorbing strap 10. As can be seen, one or more rows of fasteners 14 (e.g., threads or cords) may be stitched into the loop 12 longitudinally along the loop 12, or laterally across the loop 12, or a combination of both, or some other pattern (e.g., diagonally). Depending on the spacing of the rows, the longitudinal stitches may provide a somewhat smoother and more continuous release than the lateral stitches as the loop 12 is pulled apart. Where lateral rows of stitches are used, the fasteners 14 are designed so as to break or rip away an entire row at a time as the loop 12 is pulled apart.

The energy absorbing characteristic of the strap 10 is illustrated in Figures 2A-2B, wherein F_s represents the load capacity of the strap 10, F_r represents the load at which the loop 12 will be pulled apart, and X_m represents the stroke or displacement provided by the loop 12. In general, X_m is equal to the length of the joined or stitched portions of the loop 12, which may be the entire loop 12 or only a portion thereof. As can be seen in the graph of load F versus displacement X , the moment that the load reaches F_r , the loop 12 is pulled apart as the fasteners 14 begin to break and rip away. The loop 12 continues to be pulled apart at approximately F_r (shown by the jagged line) as the fasteners 14 break and rip away under the stress of the load. Thus, the load is maintained near F_r because the instant it exceeds F_r by any substantial amount, more fasteners 14 will break or rip away, and the loop 12 is pulled further apart. This process continues until there is no longer a loop 12 (i.e., when $X = X_m$) or until the load has been sufficiently absorbed. Therefore, the strap 10 will not break regardless of the magnitude of the applied load because the maximum load that is actually placed on the strap 10 will be below its load capacity F_s as long as the stroke X_m of the loop 12 is sufficiently large. The total load absorbed by the loop 12 may be expressed by Equation (1):

$$Load = F_r \cdot X_m \quad (1)$$

Note that, although the total absorbed load depends on both the F_r and X_m terms, the rate of absorption (i.e., how fast the load is absorbed) depends primarily on the F_r term. For purposes of the roadway barrier system of the present invention, a lower F_r translates to a more gentle deceleration, which will necessitate a larger stroke X_m , and vice versa.

Figures 3A-3B illustrate a deceleration-limiting lanyard 30 that may be used in the roadway barrier system according to some embodiments of the invention. As can be seen,

the deceleration-limiting lanyard 30 has multiple loops 12 formed therein instead of just one.

The multiple loops 12 may be formed by connecting several single-loop energy absorbing straps together in series, or by forming several loops 12 in one energy absorbing strap, or a combination of both. In any case, the load capacity of the lanyard 30 is the sum of the load

5 capacity of each loop 12 in the lanyard 30. This load capacity may be expressed by Equation (2):

$$Load = Fr \cdot (Xm1 + Xm2 + Xm3 + \dots + Xmi) \quad (2)$$

where the sum of $Xm1$, $Xm2$, $Xm3$, ..., Xmi represent the total stroke provided by the individual loops 12 in the lanyard 30. Note that every loop 12 may have the same stroke Xm ,

10 or one or more loops 12 may have a different stroke Xm , depending on the requirements of the particular application.

In some embodiments, each loop 12 of the lanyard 30 may be designed so as to be pulled apart under the same load Fr , thereby providing the lanyard 30 with a substantially constant level of deceleration. Thus, regardless of the velocity of the vehicle (e.g., 50, 100, 15 or 150 mph) at the time of impact with the roadway barrier system, the deceleration of the vehicle will be limited to some constant, preselected level. The higher velocity will, of course, require a longer stroke or displacement Xm to decelerate.

In other embodiments, however, one or more of the loops 12 may be designed so as to require a different (e.g., greater or lesser) load to pull these loops apart, so long as all or 20 most of the loops can be pulled apart with a load Fr that is lower than the load capacity F_s of the lanyard 30. For example, the first loop may be designed to be pulled apart under a load $Fr1$ which is less than a load $Fr2$ required to pull apart the next loop, and so on in the series of loops. Thus, the lanyard 30 may provide a gentle deceleration initially as the weaker

loops are pulled apart first, then increased deceleration as the stronger loops are pulled apart later. Such an arrangement may be useful where there is limited space available for bringing the vehicle to rest. As the vehicle approaches the end of the available space, the stronger loops can provide increased deceleration to quickly bring the vehicle to rest.

5 Turning now to Figure 4A, in some embodiments, the roadway barrier system of the present invention includes a high strength capture mesh or net 40. The net 40 may be a simple, ordinary net that, like the lanyards 30, is made of a flexible high-strength material such as Kevlar™ or Nylon™. Each of the opposing end portions of the net 40 may be attached, tied, connected, or otherwise secured by one or more lanyards 30 to an anchor
10 (shown in Figure 6). Alternatively, multiple lanyards 30 may be used in parallel, depending on the load capacity required.

In some embodiments, the lanyards 30 may be connected to the net 40 via load lines 42 that are also made of a high-strength material such as Kevlar™ or Nylon™. Figure 4B shows a close-up view of the load lines 42 of the net 40 being secured to the lanyards 30
15 through an optional load ring 44. As can be seen, each of the lanyards 30 and the load line 42 are routed through the load ring 44 to provide a secure connection between the lanyards 30 and the load line 42.

Figure 5 is an exploded view of a deceleration-limiting barrier 50 according to some embodiments of the invention. The barrier 50 includes a front sacrificial panel 52 that can be
20 used to hold up the net 40. In some cases, the barrier 50 may also include a back sacrificial panel 54 that is used together with the front sacrificial panel 52 to hold up the net 40. The front sacrificial panel 52 may be made of a thin layer of epoxy, concrete, plywood, or other

similar material that can be broken apart upon impact, and the back sacrificial panel 54 may be made of the same material or an even lighter material such as a foam material.

During assembly of the barrier 50, the lanyards 30 and the load lines 42 are folded or otherwise tucked onto the net 40, as shown, such that only the loose ends of the lanyards 30
5 are exposed. This assembly is then sandwiched between the front and back sacrificial panels 52 and 54 for support. The entire assembly may then be sealed, glued, or otherwise adhered together into a single barrier 50.

The assembled barrier 50 may then be attached, tied, connected, or otherwise secured via the ends of the lanyards 30 to ground anchors 60, as shown in Figures 6A-6B. The
10 ground anchors 60 may be, for example, blocks of concrete, steel, or other heavy material, and may be embedded in or otherwise secured to the ground with sufficient strength to support an impact with a high speed vehicle. In some embodiments, each of the ground anchors 60 may be constructed with an eyehook bolt 62 embedded in a concrete cone 68, with a washer 64 and a nut 66 to secure the eyehook bolt 62 in the cone 68.

15 Figure 7 illustrates a plurality of barriers 50 placed end-to-end and anchored by the ground anchors 60 to form a deceleration-limiting roadway barrier system 70. Such a roadway barrier system 70 may be installed alongside a racetrack or a roadway, according to some embodiments of the invention, to prevent spectators and pedestrians from entering the racetrack or roadway, and to keep cars and other vehicles from leaving the racetrack or
20 roadway. In some embodiments, the barriers 50 are arranged in a first row 72 and a second row 74, with each row being fully capable of decelerating a vehicle independently of the other row. The barriers 50 in the first row 72 are staggered relative to the barriers 50 in the second row 74, as shown, such that no two barriers are in register. Such an arrangement

ensures that a vehicle that happens to collide at a junction 76 between two barriers in one of the rows and possibly splitting the two barriers will still be fully captured by a barrier in the other row.

In some embodiments the junction 76 between two barriers 50 may be in the form of a joint such as a tongue-and-groove joint or a dovetail joint (not expressly shown). The barriers may each have male portions and female portions to facilitate the quick removal and replacement of the barriers 50. Such joints allow the barriers to simply be slid in and out of connection with other barriers. For this purpose, a supply of barriers 50 may be made readily available in a nearby storage area (e.g., a warehouse) to replace used barriers as needed.

A supporting pole, pipe, or shaft 78 made of rigid, but easily shattered material such as wood, aluminum, PVC, or other suitable material may be spaced at various points along the roadway barrier system 70 to provide vertical support the first and second rows 72 and 74, respectively, of the roadway barrier system 70. Other suitable structures such as L-shaped brackets or braces may also be used to support the first and second rows 72 and 74.

Figures 8A-8D illustrate a vehicle crashing into one of the barriers 50 of the deceleration-limiting roadway barrier system 70. As the vehicle crashes into the barrier 50, the sacrificial panels and any supporting poles are broken away, and the vehicle is captured in the net 40. The forward momentum of the vehicle carries the net 40 forward and causes the lanyards attached thereto to be deployed. The lanyards, which are anchored by the ground anchors, operate to decelerate the vehicle and bring it to rest by absorbing the energy of the vehicle in the manner described above. Such an arrangement limits the maximum level of deceleration or *G* force experienced by the occupants of the vehicle to near some preset level no matter how fast the vehicle is traveling. In other words, the level of

deceleration will be the same whether the vehicle impacts the barrier at 100 mph, 200 mph, or some other speed. Higher velocities, of course, will require a longer stopping distances. The maximum level of deceleration may be selected as needed to suit a particular application.

5 In some embodiments, the front sacrificial panel (see Figure 5) of each barrier 50 are designed to withstand low level glancing impacts and bumps from vehicles that are usually encountered many times during a racing event or normal roadway traffic. In other words, the front sacrificial panel may be designed so that a breakup occurs only when a significant impact is encountered. For this purpose, the front sacrificial panel may have a smooth
10 surface on the side facing the racetrack or roadway such that vehicles making a low level impact with the barrier 50 are simply deflected and allowed to continue.

Figure 9 illustrates a method 90 of decelerating a moving object such as a vehicle. The method begins at step 91 when an object crashes or is otherwise received in a load-limiting barrier such as the deceleration-limiting barrier of the present invention. At step 92,
15 the energy absorbing straps or lanyards of the barrier are deployed to decelerate the object. At step 93, the object is decelerated at a substantially constant deceleration by the energy absorbing straps or lanyards of the deceleration-limiting barrier system of the present invention. Finally, at step 94, the object is brought to rest after the energy thereof has been absorbed by the barrier system.

20 While a limited number of embodiments of the invention have been described, these embodiments are not intended to limit the scope of the invention as otherwise described and claimed herein. Variations and modifications from the described embodiments exist. For example, in some embodiments, the capture net may be a sheet instead of a net.

MSC-23178-1

Furthermore, in some embodiments, the loops in the energy absorbing strap may be bonded, adhered, or formed using Velcro™ instead of stitches to alleviate puncturing of the strap and thereby render the strap more amenable to reuse. Accordingly, the appended claims are intended to cover all such variations and modifications as falling within the scope of the
5 invention.

XII. APPENDIX D -- REQUEST FOR CLARIFICATION OF OFFICE ACTION

MAILED APRIL 18, 2003

NASA Case No. MSC-23178-1

Patent Application

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: William C. Schneider, et al.

§ Conf#:9636

Serial No.: 10/005,820

§ Group No.: 3671

Filed: December 4, 2001

§

For: DECELERATION-LIMITING
ROADWAY BARRIER

§ Examiner: Alexandra Pechhold

§

§

Commissioner for Patents
U.S. Patent and Trademark Office
Washington, D.C. 20231

Dear Sir:

<p>CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8</p> <p>I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on <u>May 16, 2003</u></p> <p>Type or Print Name: <u>James M. Catp</u></p> <p>Signature: <u>James M. Catp</u></p>
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REQUEST FOR CLARIFICATION OF OFFICE ACTION MAILED APRIL 18, 2003

Applicants' attorney wishes to thank Examiner Pechhold and her supervisor for their consideration of the case during the telephone interviews of May 16, 2003.

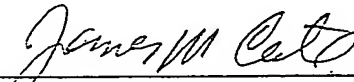
As discussed, the Office action of May 18, 2003 included a rejection (paragraph 2 of the Office action) of Claims 1-3, 5-10, 12-14, 16-22, and 24-28 under 35 U.S.C. 103(a). Paragraph 3 of the Office action indicated that allowable subject matter was found in Claims 38-43, and that those claims would be allowable if placed in independent form. However, the Office action did not include a statement of the statutory basis for rejection of pending Claims 29-37. Although it might be assumed that the comments appearing at pages 7 and 8 suggest that the Examiner intended to reject those claims under the same principles and the same combination of references employed with respect to the rejection of Claims 1-3, 5-10, 12-14, 16-22, and 24-28, no statement was provided as to whether or not Claims 29-37 were being rejected under 35 U.S.C. 103(a), or whether the two

NASA Case No. MSC-23178-1

Patent Application

references were applied as they were with respect to Claims 1-3, 5-10, 12-14, 16-22, and 24-28. Accordingly, it is respectfully requested that the Office action be corrected to clearly define the basis for the rejection of Claims 29-37.

Respectfully submitted,



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XIII. APPENDIX E -- DECLARATION OF CHRIS MURPHY, metroPATENT



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Declaration of Chris Murphy

1. I, Chris Murphy, declare as follows, under penalty of perjury.
2. Since 1992, I have worked continually in the field of patent research services. I am employed by metroPatent, 1911 S. Clark St., Suite 1800, Arlington, VA 22202.
3. I have reviewed U.S. Patent No. 5,310,277 (Uotila).
4. I have performed a serial/application/publication number search for the Finnish patent application FI 893910 referenced in Col. 2, lines 51 and 63 of Uotila '277. Specifically, my search consisted of a search of the Inpadoc database and several on-line systems, such as the EPO espace and DEPATIS in order to identify the Finnish patent application FI 893910. I also performed a search by the inventor name "Uotila" and was unable to find a document with the corresponding application number. Additionally, I ordered and reviewed the contents of the file history U.S. patent number 5,310,277 to see if the publication was in the file. Although it was mentioned a number of times throughout the file, a copy of the corresponding document was not in the file.
5. My search did not locate the Finnish patent application FI 893910.

Respectfully submitted,


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November 10, 2003